REMARKS

The claims have been amended to more clearly define the invention as disclosed in the written description. In particular, claim 3 has been made an independent claim and includes the limitations of claim 1. In addition, claim 4 has been amended for clarity.

The Examiner has rejected claims 1 and 4-6 and 8 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,111,960 to Aarts et al. U.S. Patent Application Publication No. 2003/0009327A1 to Nilsson et al.

The Aarts et al. patent discloses circuit, audio system and method for processing signals, and a harmonics generator, in which high frequency output components are generated by applying e.g., a squaring function to first components in the input signal. For example, if output components are desired in a first frequency range between 10 and 12kHz, they can be generated by the squaring function which doubles the frequency of first components in a predetermined second frequency range between 5 and 6kHz. This is useful, e.g., when the input audio signal is obtained by decompressing compressed audio like MP3 audio, in which no high frequency information is present. The lack of high frequency components results in that the audio sounds unnatural. The squaring function is a technically simple way to generate high frequency audio components. However, as acknowledged by the Examiner, Aarts et al. "fails to show that a first output energy measure, over a predetermined first time interval, of the output components

generated is set, based upon a first input energy measure calculated over a predetermined second time interval of second input components, in a predetermined third frequency range of the input audio signal, wherein the predetermined third frequency range is different from the predetermined second frequency range, and is selected from a predetermined number of frequency ranges, as the frequency range which is closest to the first frequency range according to a predetermined frequency range distance formula."

The Nilsson et al. patent discloses bandwidth extension of acoustic signals in which a narrow band acoustic signal is fed to a feature extraction unit 101, an up-scaler 102 and an excitation expansion unit 105, each having associated circuitry for processing the narrow band acoustic signal in order to improve the perceived sound quality of a decoded acoustic signal. The improvement is accomplished by means of extending the spectrum of the received acoustic signal.

The Examiner now states:

> "Nilsson teaches the importance of adjusting the energy (by 106) of the output components (from 105) to make a more natural wideband sound (para. 0055) when expanding the bandwidth of the original sound source in a narrow bandwidth. The energy in high band (corresponding to the claimed "third frequency range") is being used to determine the envelope of the output components (corresponding to the claimed "a first output energy measure") to be added with the original audio source signal (para. 0040, 0046, 0054). As shown in Fig. 4, the high band is closest to the first frequency range according to a predetermined frequency range distance formula (para. 0033)."

Applicant submits that the Examiner is mistaken. While an object of Nilsson et al. is to improve the perceived sound quality

of a decoded acoustic signal, Nilsson et al. does not perform that which is claimed in either claim 1 or claim 5. In particular, according to the Examiner, the energy in high band (corresponding to the claimed "third frequency range") is being used to determine the envelope of the output components. However, Applicant would like to point out that the high band of Nilsson et al. is the added frequency range, while the third frequency range of the subject invention lies within the input audio signal.

The subject invention determines the output components in a first frequency range (e.g., above the frequency range of the input audio signal) to be added to the input audio signal, from components in a second frequency range of the input audio signal (e.g., a low frequency range of the input audio signal), and sets a first output energy measure of the output components based on a first input energy measure in a third frequency range of the input audio signal (e.g., a high frequency range of the input audio signal).

Applicant submits that if one were to use the analogy of Nilsson et al., then the output components in the first frequency range are generated by the component 105 of Fig. 1, while the first output energy measure is adjusted by component 106. Hence, the input to block 106 must be the first input energy measure which is in a third frequency range of the input audio signal. Block 101 is described in Nilsson et al. at paragraphs [0034] and [0035] as a feature extraction unit 101. Such a feature extraction unit 101 is then described in paragraphs [0047] - [0070]. However, nowhere is

there any disclosure or suggestion of determining a third predetermined frequency range, wherein the predetermined third frequency range is different from the predetermined second frequency range (i.e., the frequency range of the input audio signal used to determine the output components), and is selected from a predetermined number of frequency ranges, as the frequency range which is closest to the first frequency range according to a predetermined frequency range distance formula.

In view of the above, Applicant believes that the subject invention, as claimed, is not rendered obvious by the prior art, and as such, is patentable thereover.

Applicant believes that this application, containing claims 1, 3-6 and 8, is now in condition for allowance and such action is respectfully requested.

Respectfully submitted,

by /Edward W. Goodman/

Edward W. Goodman, Reg. 28,613
Attorney
Tel.: 914-333-9611